Neutron and Light Charged Particle Production in neutron or proton induced reaction on iron, lead and uranium at intermediate energy (20 to 200MeV) - The HINDAS collaboration

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In the framework of the european collaboration HINDAS (High and Intermediate energy Nuclear Data for Accelerator System), several experiments using european facilities (CYCLONE at Louvain-la-Neuve (Belgium), TSL at Uppsala (Sweden), AGOR at Groningen (Nederland)) were performed in order to obtain a complete set of data (see list below) at intermediate energy between 20 and 200 MeV. Double Differential Cross-Section for neutrons and light charged particles (proton to alpha particles) emitted in neutron or proton induced reaction on iron, lead and uranium are now avaible and will be presented after a brief description of the different facilities and associated set-up.

List of Experiment performed within the HINDAS collaboration : Fe, Pb, U (p,Xn+Ylcp) at 65 MeV - Fe, Pb, U (n,Xlcp) at 100 MeV - Fe, Pb, U (p,Xlcp) at 135 MeV

Using the Kalbach parametrization, differential cross-section in energy and production cross-section were derived from our measurements. Comparison with theoretical predictions will be shown in particular with existing codes as MCNPX, FLUKA, PREEQ but also with codes developped in the framework of the HINDAS collaboration as TALYS and DYWAN. While all differents approaches are in agreement with the measured neutron and proton production, none of them except PREEQ is able to reproduce complex particle emission. This result underline the strong need of new developments in theoretical prediction.

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